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March 9, 2006

Ms. Colleen Hunt  
California Regional Water Quality Control Board  
North Coast Region  
5550 Skylane Boulevard Suite A  
Santa Rosa, California 95403

RE: **2005 Annual Summary and Monitoring Report**  
SECOR Project No.: 77CP.60009.01.0220

Dear Ms. Hunt:

On behalf of ConocoPhillips, SECOR International Incorporated (SECOR) is forwarding the quarterly summary report addendum for the following location:

**Service Station**

Former Bulk Plant No. 0220

**Location**

720 North Franklin Street  
Fort Bragg, California

Sincerely,  
**SECOR International Incorporated**

Thomas M. Potter  
Project Scientist

Attachments: SECOR's *Annual Summary Report – First through Fourth Quarter 2005*

cc: Mr. Thomas Kosel, ConocoPhillips

**2005 ANNUAL SUMMARY REPORT**

Former Bulk Plant No. 0220  
720 North Franklin Street  
Fort Bragg, California

City/County ID #: Fort Bragg

County: Mendocino

**SITE DESCRIPTION**

The site is located near the north end of the city of Fort Bragg at the corner of Franklin Street and Spruce Street. Pudding Creek is located approximately 1,200 feet north of the site, and the Pacific Ocean is located approximately 2,400 feet west of the site. The facility was built in 1924 and currently consists of a storehouse, an office, a drum storage and filling area, five above ground storage tanks (ASTs), a pump area, and loading racks. Former components of the facility included two 550-gallon underground spill contaminant tanks (SCTs) used to collect overflow spillage and overflow spillage with waste oil respectively, and a pump area. Product was historically supplied to the bulk plant by rail and for the past 30 years by truck. There are two separate unloading racks; one was to service rail cars (currently not in use) and the other to service trucks. Both the train and truck unloading racks serviced the bulk storage ASTs and loading rack via underground pipelines. The tank farm has a capacity of 85,000 gallons of storage with four 20,000-gallon ASTs and one 5,000-gallon AST.

**PREVIOUS INVESTIGATIONS AND REMEDIAL ACTIVITIES**

In September 1988, Kaprealian Engineering Incorporated (KEI) conducted a preliminary site investigation that included the installation of six borings for soil and groundwater sampling (EB-1 through EB-6). The borings were advanced to a total depth ranging from 17 to 19 feet below ground surface (bgs). Total petroleum hydrocarbons with gasoline distinction (TPHg) and total petroleum hydrocarbons with diesel distinction (TPHd) were detected in soil and groundwater at concentrations ranging from 80 milligrams per kilogram (mg/kg) to 340 mg/kg, respectively.

On January 23, 1989, KEI oversaw the installation of four monitoring wells (MW-1 through MW-4) at the site. The wells were installed at depths ranging from 20 to 25.5 feet bgs. Groundwater was encountered at depths ranging from 10.5 to 14 feet bgs. All soil samples taken from the monitoring wells recorded non detectable concentrations of TPHg, TPHd, and benzene, toluene, ethyl-benzene and total xylenes (collectively BTEX) except the ten foot sample from MW-4 which recorded a concentration of 790 mg/kg of TPHg. Groundwater samples taken from the wells contained concentrations of benzene ranging from 4.1 to 87 micrograms per liter ( $\mu\text{g/l}$ ), concentrations of TPHg ranging from 2800 to 8800  $\mu\text{g/l}$ , and concentrations of TPHd ranging from 1900 to 160,000  $\mu\text{g/l}$ .

On March 29, 1989, KEI oversaw the installation of five additional monitoring wells (MW-5 through MW-9) at the site. The wells were installed at depths ranging from 18 to 20 feet bgs. Groundwater was encountered at depths ranging from 9 to 15.5 feet bgs. Soil samples from the borings were analyzed for TPHg, TPHd, and BTEX. TPHg was found in the 10-foot sample from MW-5 at a concentration of 1.1 mg/kg. TPHd was detected in soil from MW-6 at a concentration of 400 mg/kg.

On July 26, 1989, KEI oversaw the installation of two additional monitoring wells (MW-10 and MW-11) at the site. The wells were installed at depths ranging from 19 to 20 feet bgs. Soil samples from the borings were analyzed for TPHg, TPHd, and BTEX. TPHg and TPHd were found in the 13-foot sample from MW-11 at concentrations of 31 mg/kg and 120 mg/kg, respectively. Groundwater samples taken from the MW-10 and MW-11 contained TPHd at concentrations of 180 µg/l and 540 µg/l, respectively.

On September 1, 1995, KEI oversaw the installation of one additional groundwater monitoring well (MW-12) at the site. The well was installed at a depth of 19 feet bgs. Soil samples from the borings were analyzed for TPHg, TPHd, and BTEX. All soils recorded non-detectable concentrations of all analytes. Groundwater samples taken from the well contained TPHg, TPHd, benzene, toluene, and ethylbenzene at concentrations of 430 µg/l, 220 µg/l, 7.2 µg/l, 51 µg/l, and 12 µg/l, respectively.

In December 1996, KEI oversaw the removal of two 550 gallon spill containment tanks. During the excavation, KEI conducted a limited excavation around the vicinity of the tanks. In February 1997, Pacific Environmental Group (PEG) conducted a Phase I site assessment of the site. To follow up with this assessment, on September 25, 1997, PEG oversaw the advancement of five soil borings (SB-1 through SB-4 and HB-1). The borings were advanced to depths ranging from 17.7 to 35 feet bgs. Soil samples analyzed from HB-1, SB-1, and SB-4 contained relatively low concentrations of TPHg and TPHd. The highest concentration of TPHg (37 mg/kg) and TPHd (28 mg/kg) were seen in the five-foot sample taken from SB-1.

In February 1998, the quarterly monitoring activities at the site were taken over by Gettler-Ryan (GRI).

In September 1998, SHN Consulting Engineers & Geologists Inc. (SHN) prepared an interim corrective action plan (ICAP) for the site. In the ICAP, SHN recommended the installation of a supplemental oxygen source to enhance bioremediation processes at the site.

On April 12, 1999, SHN performed an additional subsurface investigation at the site. During the investigation, ten soil borings (SB-101 through SB-110) were advanced and abandoned, aquifer slug tests were performed on existing groundwater monitoring wells, and petroleum hydrocarbon fingerprinting was performed on the groundwater from the site. Based on the results of these three tests, SHN recommended the installation of a biosparge system.

During May and June of 2000, SHN supervised the installation of one bioventing test well, two biosparge wells, and three bioventing observations wells. A bioventing pilot test and a biosparge pilot test were conducted to determine the effectiveness of each method for site

remediation. Based on the results of the pilot tests, the anticipated radius of influence for a bioventing system is 30 feet per well.

On December 5, 2002, SHN recommended the installation of 7 additional bioventing wells and 20 additional ozone sparge points at the site.

On October 8 and 9, 2003, SHN oversaw the installation of biovent wells (BV-2 through BV-8).

On October 7 through 10, 2004, SHN oversaw the installation of 20 ozone sparge wells (SP-1 through SP-20). Soil samples were analyzed from all the borings. The highest concentrations of hydrocarbons were found in soils taken from SP-7 and SP-18. Soil borings and well construction details are presented in Table 1.

## 2005 ANNUAL REPORT

Quarterly groundwater monitoring and sampling was conducted by TRC on February 3, May 5, August 4, and November 3, 2005 in accordance with RWQCB-NCR MRP No. R1-2003-0107 (Attachment 1).

### Trends in Groundwater Flow Direction and Gradient during 2005

During 2005, gauging of the 12 groundwater monitoring wells was conducted on February 3, May 5, August 4, and November 3, 2005. During the four 2005 groundwater monitoring events, depth to water ranged from as shallow as 7.95 feet below TOC to as deep as 16.07 feet below TOC. Seasonal (quarterly) fluctuations of up to 4 feet are typical between quarterly events. Trends in depth to water and seasonal fluctuations noted during 2005 are consistent with historical trends. Historical water level information is tabulated in TRC's *Quarterly Monitoring Report October Through December 2005* (Attachment 2).

During 2005, the direction of groundwater flow was reportedly toward the northwest at hydraulic gradients ranging from 0.02 to 0.025 ft/ft. Flow directions reported during 2005 are consistent with the predominantly northwest flow direction historically reported. Hydraulic gradients reported during 2005 are also consistent with the historical magnitudes of gradient which typically ranges from 0.01 to 0.07 ft/ft. Historical water gradients are presented in Table 2.

Historical groundwater elevation contour maps from the first, second, and third quarter 2005 monitoring events are included in Attachment 3. The groundwater elevation contour map for the fourth quarter 2005 monitoring event is included in TRC's *Quarterly Monitoring Report October Through December 2005* (Attachment 2).

### Evaluation of Historical Groundwater Quality and 2005 Trends

Quarterly groundwater monitoring and sampling activities have been conducted at this site for more than 17 years. An evaluation of historical groundwater analytical data indicates that dissolved-phase TPHg (now analyzed for TPPH) and TPHd plumes are located in the area of the ASTs, the lubricant storage shed, and the fuel rack (wells MW-1, MW-3, MW-4 and MW-8) with the highest concentrations identified near the ASTs.

In the vicinity of the fuel loading rack crossgradient of the ASTs in the western portion of the site (MW-3), concentrations of TPHg and benzene peaked in well MW-3 in 1989 (7,700 and 7.1 µg/l, respectively). TPHd peaked in 2000 at 17,000 µg/l. Since that time, concentrations of TPHg, TPHd have generally decreased and currently (August 4, 2005) are <50, and 170 µg/l respectively. Benzene concentrations have historically been detected below laboratory reporting limits since February 7, 1989. MTBE has never been detected from MW-3.

In the area immediately north of the ASTs (MW-8) in the northern portion of the site, LPH or sheen has been consistently detected or visible in well MW-8 since April 1991 to August 2000. LPH has not been detected in any other site wells during the historical monitoring period. Sheen has been reported in wells MW-3, MW-4, and MW-11 during the historical monitoring period.

In the area immediately north of the lubricant storage shed (MW-4) in the northeastern portion of the site, concentrations of TPHd, TPHg (now analyzed as TPPH), and Benzene peaked during separate occasions during the reporting history. TPHd peaked in August 2002 at 1,700,000 µg/l, TPHg peaked in August 2000 at 620,000 µg/l and Benzene peaked in January 1990 at 140 µg/l. MtBE historically has not been detected from MW-4.

Based on a review of results reported within and prior to the year 2005, petroleum hydrocarbon as TPHd and TPPH generally show decreasing trends in concentrations but fluctuate within the measured historical values. Benzene and MtBE continue to be reported below laboratory reporting limits. A summary of petroleum hydrocarbon trends reported over the year 2005 within the individual site wells is presented below.

Well	TPHd Trend	TPHg Trend	Benzene (Concentration last reported/date)	MtBE (Concentration last reported/date)
MW-1	Fluctuating	Fluctuating	2.0 µg/l 7/30/90	6.8 µg/l / 8/9/01
MW-2	Stable	Stable	.45 µg/l 7/30/90	6.3 µg/l 2/15/00
MW-3	Fluctuating	Fluctuating	7.1 µg/l 2/7/89	--
MW-4	Fluctuating	Fluctuating	5.2 µg/l 5/11/00	--
MW-5	Stable	Stable	2.2 µg/l 4/30/90	--
*MW-6	Fluctuating	Stable	0.51 µg/l 7/30/90	--
MW-7	Stable	Stable	5.0 µg/l 1/26/90	--
MW-8	Fluctuating	Fluctuating	0.5 µg/l 2/19/99	310 µg/l 2/24/04
*MW-9	Stable	Stable	--	5.0 µg/l 2/24/04
MW-10	Fluctuating	Stable	0.51 10/27/93	4.1 µg/l 8/4/05
MW-11	Fluctuating	Fluctuating	0.50 11/24/99	0.58 µg/l 11/10/04
MW-12	Stable	Stable	--	5.5 µg/l 8/9/00

µg/l = micrograms per liter  
 -- = Constituent never detected in monitoring well  
 \* = Annually Sampled

## BIO-ATTENUATION PARAMETER EVALUATION

Petroleum hydrocarbons biodegrade naturally when an indigenous population of hydrocarbon-degrading microorganisms is present in the aquifer, and sufficient concentrations of electron acceptors and nutrients are available to these organisms. In most subsurface environments, both aerobic and anaerobic degradation of petroleum

hydrocarbons can occur, often simultaneously in different parts of the plume. Naturally occurring electron acceptors commonly used in microbial metabolism of organic contaminants include dissolved oxygen (DO), nitrate, ferric iron (Fe III or  $\text{Fe}^{3+}$ ), manganese, sulfate, and in some cases, carbon dioxide. Although microbes utilize Fe III as the terminal electron acceptor during Fe III reduction, the metabolic by-products of this reaction, ferrous iron (Fe II or  $\text{Fe}^{2+}$ ) is measured to confirm the occurrence of this reduction process.

In the first and third quarters of each year, groundwater samples collected from wells MW-4 and MW-10 through MW-12 are analyzed in the field for DO, oxidation reduction potential (ORP), and ferrous iron (Fe II), and in the laboratory for nitrate and sulfate by EPA Method 300.0. Bio-attenuation parameters collected since the second quarter 1999 are summarized in Table 3. The wells monitored for bio-parameters have been subdivided within Table 3 by their location relative to the dissolved petroleum hydrocarbon plume. In order to compare the concentrations of the various bio-attenuation parameters on and off-site, the average concentration of each parameter in the up-gradient well MW-4 and down-gradient wells (MW-10, MW-11 and MW-12) were calculated, and are presented in Table 3. Results through the year 2005 are discussed below.

### **Dissolved Oxygen**

DO is the most thermodynamically active electron acceptor in the biodegradation of petroleum hydrocarbons. DO concentrations can be used to estimate the mass of contaminant that can be biodegraded by aerobic processes. During aerobic biodegradation, DO levels are reduced as aerobic respiration occurs. If sufficient DO (greater than 1 to 2 mg/L) is present in the groundwater, aerobic biodegradation can degrade petroleum hydrocarbons.

A comparison of the average DO measurements collected through the fourth quarter 2005 shows that the average DO measurements upgradient of the plume is 1.19 milligrams per liter (mg/L), and 1.86 mg/L down-cross gradient of the plume.

### **Oxidation-Reduction Potential (ORP)**

ORP is an indicator of certain geochemical processes, such as sulfate reduction. Under oxidizing conditions, ORP measurements in groundwater are positive and under reducing conditions, ORP is negative. Reducing conditions may be measured where anaerobic biodegradation is occurring. ORP of groundwater inside the plume should be somewhat less than ORP readings measured outside of the plume.

A comparison of the average ORP readings through the fourth quarter 2005 is presented in Table 3. Positive average ORP measurements for upgradient well MW-4 (104.50 mV) and downgradient wells MW-10 (41 mV), MW-11 (24 mV), and MW-12 (85.5 mV) indicate that oxidizing conditions are present. Negative ORP measurements were identified in MW-10 (one event), MW-11 (two events) and MW-12 (one event) during 2005 located downgradient of the source indicate that anaerobic biodegradation of petroleum hydrocarbons is likely occurring.

## pH

pH is defined as the negative logarithm of the hydrogen ion activity, and describes whether a solution is acidic ( $\text{pH} < 7$ ), neutral ( $\text{pH} = 7$ ), or basic ( $\text{pH} > 7$ ). The pH of groundwater affects the presence and activity of microbial populations in groundwater. Microbes capable of degrading petroleum hydrocarbons generally prefer pH values between 6 and 8. Microbial activity can change the pH of groundwater. A difference in pH between contaminated and uncontaminated groundwater is another potential indicator of biological activity.

A comparison of average pH measurements in Table 3 shows that the pH readings in down-gradient of the source area (5.93, 6.11, and 6.30 from MW-10, MW-11, and MW-12 respectively) are greater than the average pH measurements from well MW-4 (5.83) located upgradient of the dissolved plume. The difference in average pH measurements indicates that biologic activity has affected pH within the dissolved petroleum hydrocarbon plume.

## Conductivity

Aqueous conductivity is the measure of the ability of a solution to conduct electricity. The conductivity of groundwater is directly related to the concentration of ions in solution; conductivity increases as ionic concentrations increase. Conductivity is measured to ensure that groundwater samples collected at the site are representative of groundwater in which dissolved petroleum hydrocarbons may be present. If the conductivities of the samples collected from different sampling points differ significantly, this may indicate a different hydrologic zone, or that the groundwater is being affected by dissolved contaminants.

A comparison of the average conductivity measurements shows that conductivity fluctuates from the average measurements calculated in upgradient well MW-4 [240.5 micro-ohms per centimeter (umhos/cm)], 285 umhos/cm average in MW-10, 266.5 umhos/cm average in MW-11, and 232 umhos/cm average in MW-12 down-gradient of the source area.

## Ferrous Iron (Fe II or $\text{Fe}^{2+}$ )

In some cases, ferric iron ( $\text{Fe III}$  or  $\text{Fe}^{3+}$ ) is used as an electron acceptor during anaerobic biodegradation of petroleum hydrocarbons. In this process, ferric iron is reduced to the ferrous form ( $\text{Fe II}$  or  $\text{Fe}^{2+}$ ), which may be soluble in water. Ferrous iron concentrations are used as indicators of anaerobic degradation of petroleum hydrocarbons.

A comparison of the average Fe II measurement shows that the average Fe II measurement down-gradient [0.83 milligram per liter (mg/L)] are lesser than the average ferrous iron measurement from up-gradient well MW-4 (0.18 mg/L) indicating that the ferrous iron is not an accurate indicator for anaerobic degradation of petroleum hydrocarbons at this site.

## Nitrate ( $\text{NO}_3^-$ )

After DO has been depleted in the microbiological treatment zone, nitrate may be used as an electron acceptor for anaerobic biodegradation. In this process of de-nitrification, nitrate

is reduced to nitrite ( $\text{NO}_2^-$ ). Therefore, changes in nitrate concentrations across a contaminant plume can be used as another indicator of bioactivity.

A comparison of the average nitrate concentrations collected through the fourth quarter 2005 shows a increase, from .55 mg/L in up-gradient monitoring point MW-4 to an average from down-gradient wells MW-10, MW-11, and MW-12 of 4.90 mg/L during 2005. This increase in average nitrate concentrations indicating that Nitrate is not an accurate indicator for anaerobic degradation of petroleum hydrocarbons at this site.

## **Sulfate ( $\text{SO}_4^{2-}$ )**

After DO and nitrate have been depleted in the microbiological treatment zone, sulfate may be used as an electron acceptor for anaerobic biodegradation. This process is sulfanogenesis, and results in the production of sulfide. The reduction of sulfate concentrations is used as an indicator of anaerobic degradation of petroleum hydrocarbons.

A comparison of the average sulfate concentrations through the fourth quarter 2005 shows a slight decrease from 44 mg/L reported in up-gradient monitoring point MW-4, to an average from down-gradient wells MW-10, MW-11, and MW-12 of 31.5 mg/L during 2005. The decline in average sulfate concentrations in wells located down-gradient from the site indicates that anaerobic biodegradation is occurring in the area by way of sulfate reduction.

## **PLUME STATUS**

The extent of dissolved-phase petroleum hydrocarbons (TPPH and TPHd) in groundwater are currently defined by the current groundwater monitoring well network with the exception directly north between MW-5 and MW-12 and to the southeast of MW-4.

## **SITE REMEDIATION**

Currently the site has an operational bio-vent system and an inoperable ozone system. During the first quarter of 2005 the ozone system was discovered inoperable due to backpressure from the wells and the inability for the system to move well head pressure. It was determined that ball valves should be placed in each sparge line and new pressure gauges downstream of the ball valves at each sparge line. This was to regulate backpressures on the compressor to prevent the system from shutting down.

On August 9, 2005, SHN installed new ball valves and pressure gauges to repair the ozone separation system. After the installation was complete the system was then turned on. Shortly after power was applied, a short on the ozone generator circuit board occurred and the system went down. A visual inspection identified that the circuits had went bad and therefore, the system is non operational at this time.

SECOR is evaluating options to repair or replace this remediation system. Operational data for the Ozone System are summarized in Table 4. Ozone injection - groundwater monitoring data is summarized in Table 5. Concentration vs. Time Graphs for the Ozone Injection Monitoring Wells can be found in Attachment 3.

## WORK COMPLETED DURING 2005

- Completed ozone system modification. System was started and failed due to short circuiting of the circuit card on the ozone system.
- Conducted first quarter 2005 groundwater monitoring and sampling activities on February 3, 2005 (conducted by TRC).
- Submitted *First Quarter 2005 Groundwater Monitoring and Site Status Report*, dated April 14, 2005 to the RWQCB-NCR
- Conducted second quarter 2005 groundwater monitoring and sapling activites on May 5, 2005 (conducted by TRC).
- Submitted *Second Quarter 2005 Groundwater Monitoring and Site Status Report*, dated July 22, 2005 to the RWQCB-NCR
- Submitted Addendum to the *Second Quarter 2005 Groundwater Monitoring and Site Status Report dated July 22, 2005* on September 23, 2005
- Conducted third quarter 2005 groundwater monitoring and sampling activities on August 4, 2005 (conducted by TRC).
- Submitted *Third Quarter 2005 Groundwater Monitoring and Site Status Report*, dated October 19, 2005 to the RWQCB-NCR.
- Conducted fourth quarter 2005 groundwater monitoring and sampling activities on October 3, 2005 (conducted by TRC).

## WORK PROPOSED (FIRST QUARTER 2006)

- Conduct the first quarter 2006 groundwater monitoring and sampling activities (to be conducted by TRC).
- Submit the *2005 Annual Groundwater Monitoring and Site Status Report* to the RWQCB-NCR by March 1, 2006.
- Final evaluation of ozone system repair and/or replacement.
- Continue to evaluate the effectiveness of the ozone and bio-vent systems operating at the site.

## DISCUSSION


Evaluation of all data collected during the monitor and sample year 2005 indicates two areas of that additional site assessment may be warranted for final determination of lateral

extent of petroleum hydrocarbons. Additionally, data suggest, even though the ozone system is not running, that natural attenuation is occurring. Updating the current ozone system and bringing it back on-line will help speed up the attenuation process.

## LIMITATIONS

This report presents our understanding of existing conditions at the subject site. Evaluations of the geologic conditions at the site for the purposes of this investigation are inherently limited due to the number of observation points. There are no representations, warranties, or guarantees that the points selected for sampling are representative of the entire site. Data from this report reflects the conditions at specific locations at a specific point in time. SECOR assumes no responsibility for work reported or performed by other consultants or contractors. No other interpretation, representations, warranties, guarantees, express or implied, are included or intended in the report findings.

Sincerely,  
**SECOR International Incorporated**

  
 Thomas M. Potter  
 Project Scientist

  
 Rusty Benkosky, P.E.  
 Principal Engineer

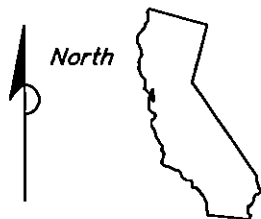
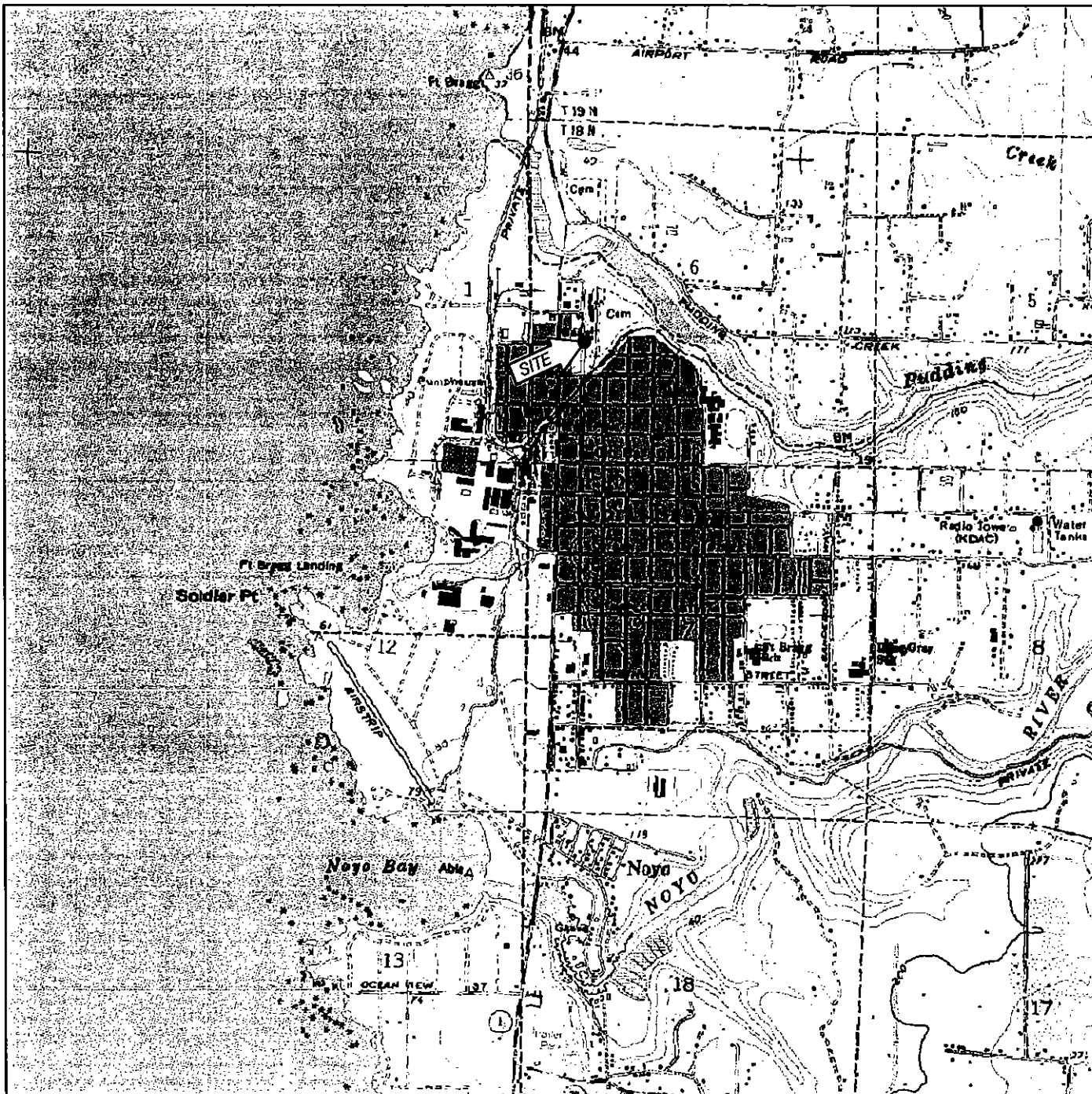


Attachments: Figure 1 – Site location Map  
 Figure 2 – Site Plan

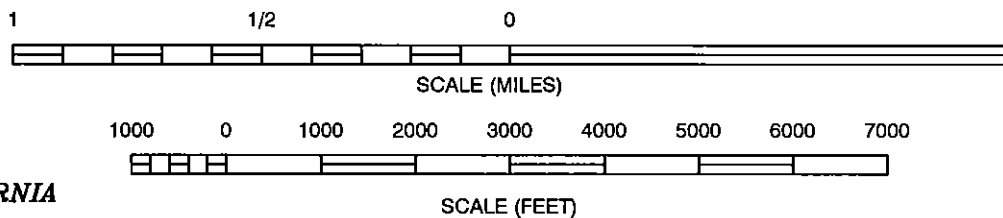
Table 1 – Soil Boring and Well Construction Details  
 Table 2 – Historical Groundwater Flow Direction and Gradient Data  
 Table 3 – Bio-Attenuation Parameters  
 Table 4 – Ozone Injection – System Operation Data  
 Table 5 – Ozone Injection – Groundwater Monitoring Data

Attachment 1 – RWQCB-NCR MRP No. R1-2003-0107  
 Attachment 2 – TRC's Quarterly Monitoring Report October through November, 2005  
 Attachment 3 – Concentration vs. Time Graphs – Ozone Injection Monitoring Wells

FIGURES



CALIFORNIA



REFERENCE: USGS 7.5 MINUTE QUADRANGLE, FORT BRAGG, CALIFORNIA



**SECOR**

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RANCHO CORDOVA, CALIFORNIA  
PHONE: (916) 861-0400/861-0430 (FAX)

FOR:

CONOCOPHILLIPS  
BULK PLANT NO. 0220  
20 NORTH FRANKLIN STREET  
FORT BRAGG, CALIFORNIA

JOB NUMBER:  
77CP.60927.06

DRAWN BY:  
DWR

CHECKED BY:  
TP

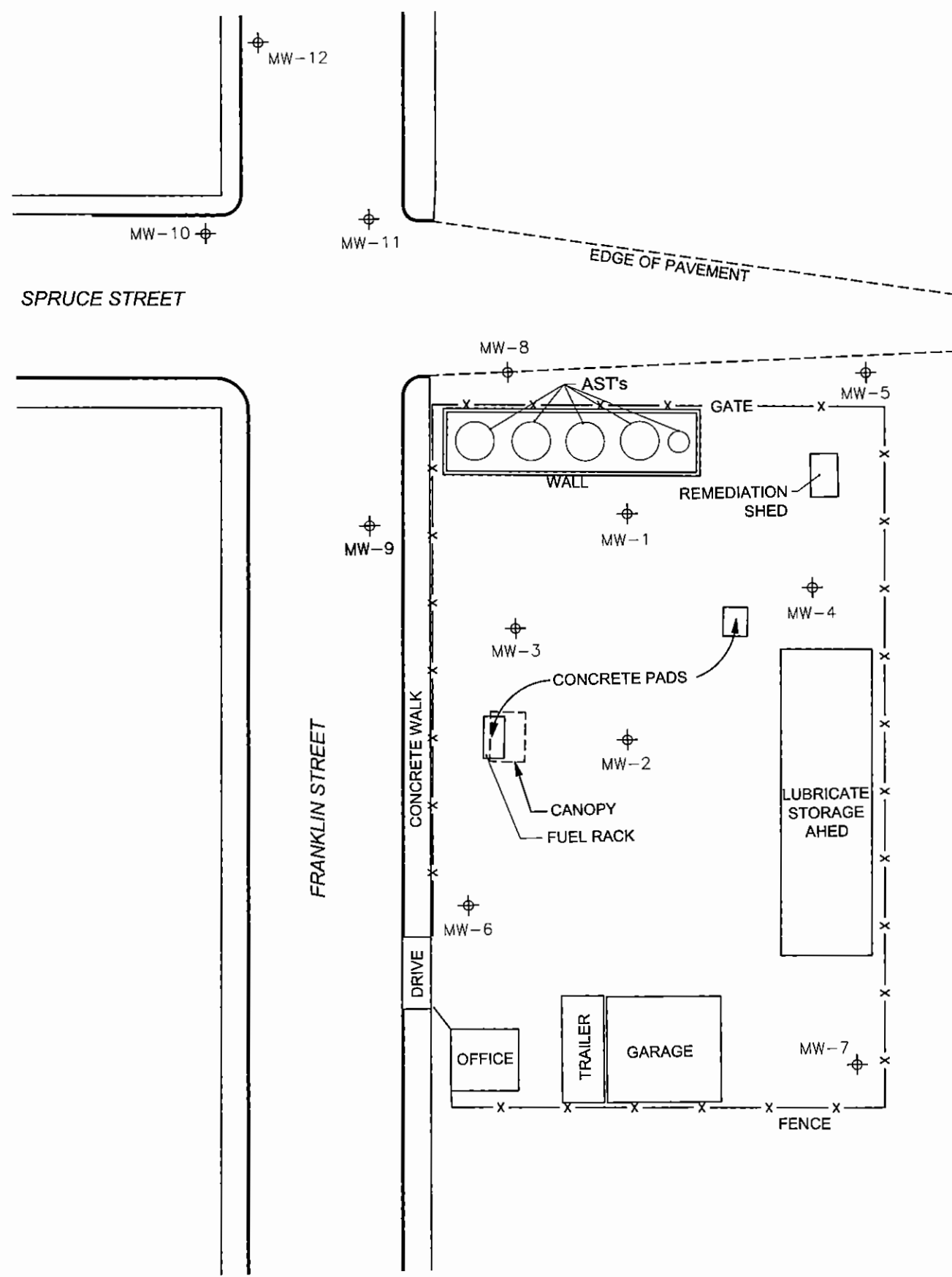
APPROVED BY:  
TP

FIGURE:

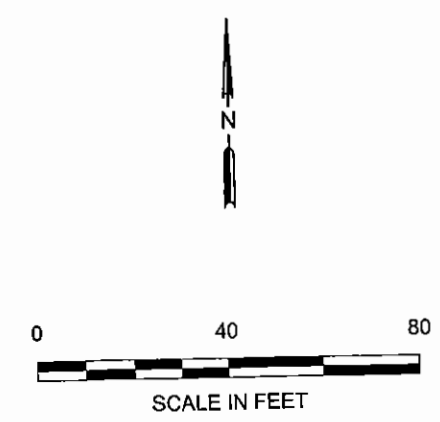
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DATE:  
2/28/06


**SITE LOCATION MAP**



**LEGEND:**  
 MW-1 GROUNDWATER MONITORING WELL LOATION  
 -x-x-x- FENCE



REFERENCE: THIS FIGURE IS BASED ON A MAP PROVIDED BY MORROW SURVEYING

  3017 KILGORE ROAD, SUITE 100 RANCHO CORDOVA, CALIFORNIA PHONE: (916) 661-0400/661-0430 (FAX)	FOR:  CONOCOPHILLIPS BULK PLANT NO. 0220 20 NORTH FRANKLIN STREET FORT BRAGG, CALIFORNIA		SITE PLAN		FIGURE:  2
	JOB NUMBER: 77CP.60927.06	DRAWN BY: DWR	CHECKED BY: TP	APPROVED BY: TP	DATE: 2/28/06

TABLES

**Table 1**  
**Soil Boring and Well Construction Details**

Former Bulk Plant No. 0220  
720 North Franklin Street  
Fort Bragg, California

Well I.D.	Date Installed	TOC/ PVC Elevation (feet, MSL)	Ground Surface Elevation (feet, MSL)	Well			Well Screen			Filler Pack Top (feet, bgs)	Filler Pack Top (feet, MSL)	Filter Pack Bottom (feet, bgs)	Filter Pack Bottom (feet, MSL)	Ben- tonite Top (feet, bgs)	Ben- tonite Top (feet, MSL)	Ben- tonite Bottom (feet, bgs)	Ben- tonite Bottom (feet, MSL)
				Depth (feet, bgs)	Depth (feet, MSL)	Diameter (inches)	Top (feet, bgs)	Top (feet, MSL)	Bottom (feet, bgs)								
MW-1	01/23/89	--	--	20.5	--	2	10.5	--	20.5	8	--	20.5	--	6	--	8	--
MW-2	01/24/89	--	--	25.5	--	2	10.5	--	25.5	8	--	25.5	--	6	--	8	--
MW-3	01/24/89	--	--	22.0	--	2	10.0	--	22	8	--	22	--	6	--	8	--
MW-4	01/24/89	--	--	20	--	2	10.0	--	20	8	--	20	--	6	--	8	--
MW-5	03/29/88	--	--	20	--	2	10.0	--	20	8	--	20	--	6	--	8	--
MW-6	03/29/89	--	--	18.0	--	2	8.0	--	18	8	--	18	--	8	--	8	--
MW-7	03/29/89	--	--	18.0	--	2	8.0	--	18	8	--	18	--	8	--	8	--
MW-8	03/29/89	--	--	18.0	--	2	8.0	--	18.0	6	--	18	--	4	--	8	--
MW-9	03/29/89	--	--	19.0	--	2	9.0	--	19.0	7	--	19	--	5	--	7	--
MW-10	7/25/88	--	--	19	--	2	4.0	--	19.0	3	--	19	--	1	--	3	--
MW-11	7/25/89	--	--	20	--	2	4.0	--	20.0	3	--	20	--	1	--	3	--
MW-12	9/1/95	--	--	20.0	--	2	4.0	--	19.0	3	--	19	--	2	--	3	--

**Explanations:**

feet, MSL = Elevation in feet relative to mean sea level.

TOC = Top of well casing.

bgs = Below ground surface.

PVC = Polyvinyl chloride.

-- = Data unavailable

**Table 2**  
**Historical Groundwater Flow Direction and Gradient Data**

ConocoPhillips Bulk Plant No. 0220  
 720 North Franklin Street  
 Fort Bragg, California

Date	Average Groundwater Flow Direction	Average Gradient (ft/ft)
2/19/1999	NW	0.02
5/19/1999	NW	0.02
8/5/1999	WNW	0.03
11/24/1999	NW	0.04
2/15/2000	NW	0.02
3/11/2000	NW	0.02
8/9/2000	WNW	0.01 to 0.06
11/27/2000	WNW	0.01 to 0.04
2/14/2001	NW	0.02 to 0.07
5/11/2001	NW	0.01 to 0.03
8/9/2001	NW	0.01 to 0.05
11/30/2001	NW	0.02 to 0.04
2/7/2002	NW	0.01 to 0.03
5/10/2002	NW	0.01 to 0.04
8/15/2002	NW	0.02 to 0.04
11/14/2002	NW	0.02 to 0.06
2/13/2003	WNW	0.01 to 0.03
5/16/2003	NW	0.01 to 0.02
8/12/2003	NNW	0.01 to 0.07
12/22/2003	NW	0.02
2/24/2004	NW	0.02
5/6/2004	NW	0.02
8/4/2004	NW	0.02
11/10/2004	NW	0.02
2/3/2005	NW	0.02
5/5/2005	NW	0.02
8/4/2005	NW	0.02
11/3/2005	NW	0.025
<b>Notes:</b> ft/ft                      Feet per foot NW                        Northwest WNW                      West Northwest NNW                      North Northwest Historical groundwater flow directions above are interpreted by SECOR based on a review of historical figures created by Gettler-Ryan Inc. and TRC.		

**Table 3**  
**Bio-Attenuation Parameters**

Former Bulk Plant No. 0220  
720 North Franklin Street  
Fort Bragg, California

Date Sampled	Pre-Purge Dissolved Oxygen (mg/l)	Post-Purge Dissolved Oxygen (mg/l)	Dissolved Carbon Dioxide (µg/l)	Oxidation- Reduction Potential (mV)	Conductivity (µS/cm)	Temp (°C)	pH	Head Space			Nitrate, NO <sub>3</sub> (mg/l)	Sulfate, SO <sub>4</sub> (mg/l)	Ferrous Iron, Fe (II) (mg/l)
								Carbon Dioxide (%)	Oxygen (%)	Organic Vapor (ppm)			
<b>Up-gradient Monitoring Wells</b>													
<b>MW-4</b>													
08/22/95	--	--	--	--	--	--	--	--	--	--	--	--	--
05/19/99	0.18	0.17	1.7	68.5	--	--	--	--	--	--	ND	2.6	--
08/05/99	1.22	1.30	4.2	48.2	--	--	--	--	--	--	ND	2.3	--
11/24/99	3.81	4.55	16	474	--	--	--	--	--	--	ND	5.7	--
02/15/00	6.21	5.76	--	56	--	--	--	--	--	--	43	11	--
05/11/00	4.90	4.01	5.2	94	--	--	--	--	--	--	ND	2.7	--
08/09/00	3.22	3.09	8.9	34	--	--	--	--	--	--	ND	4.5	--
11/27/00	2.75	2.70	ND	46	--	--	--	--	--	--	ND	7.4	--
02/14/01	6.8	3.2	22	63	--	--	--	--	--	--	ND	13	--
05/11/01	5.2	3.4	7.5	44	--	--	--	--	--	--	0.206	5.3	--
08/09/01	6.4	3.3	12	54	--	--	--	--	--	--	<1.0	3.3	--
11/30/01	5.7	3.4	21	55	--	--	--	--	--	--	0.33	12	--
02/07/02	2.5	3.3	11	63	--	--	--	--	--	--	<0.200	6.2	--
05/10/02	1.1	--	16	61	--	--	--	--	--	--	0.27	4.6	--
08/15/02	2.6	--	20	-15	--	--	--	--	--	--	<0.89	1.7	--
11/14/02	1.6	--	27	106	--	--	--	--	--	--	<0.20	3.1	--
02/13/03	1.4	--	11	18	--	--	--	--	--	--	<0.20	8.8	--
05/16/03	1.4	--	13	55	--	--	--	--	--	--	2	15	--
08/12/03	1.3	--	39	30	--	--	--	--	--	--	<1.0	1.3	--
05/06/04	4.51	--	--	10	--	--	--	--	--	--	--	--	--
08/04/04	4.64	--	--	9	--	--	--	--	--	--	<1.0	5.1	3.3
11/10/04	1.48	--	--	--	--	--	--	--	--	--	--	--	--
02/03/05	1.21	--	11	16	295	20.1	6.02	0.10	21.60	0.00	1.1	76	2.4
05/05/05	0.84	--	15	147	218	14.5	6.07	0.00	20.90	0.00	--	--	--
08/04/05	1.53	--	27	189	162	14.4	6.06	0.10	20.90	0.00	<1.0	12	0.41
11/03/05	1.20	--	6	66	287	14.6	5.14	0.00	20.90	2.50	--	--	--
<b>Average Concentrations</b>	<b>2.85</b>			<b>74.66</b>	<b>240.6</b>		<b>5.83</b>	<b>0.05</b>	<b>21.08</b>	<b>0.63</b>	<b>0.78</b>	<b>9.79</b>	<b>2.04</b>
<b>Down-gradient Monitoring Wells</b>													
<b>MW-10</b>													
08/22/95	--	--	--	--	--	--	--	--	--	--	--	--	--
05/19/99	0.63	0.65	2.2	19.1	--	--	--	--	--	--	3.3	12	--
08/05/99	3.06	1.45	3.6	55.2	--	--	--	--	--	--	ND	7.9	--
02/15/00	6.26	8.14	--	225	--	--	--	--	--	--	8.2	14	--
08/09/00	2.62	3.53	6.4	106	--	--	--	--	--	--	ND	10	--
02/14/01	3.7	4.7	15	168	--	--	--	--	--	--	ND	12	--
08/09/01	3.4	4.4	12	154	--	--	--	--	--	--	<1.0	11	--
02/07/02	4.5	5.6	13	170	--	--	--	--	--	--	1.1	13	--
08/15/02	2.5	--	13	-15	--	--	--	--	--	--	<0.89	9.7	--
02/13/03	4.6	--	ND<10	81	--	--	--	--	--	--	2.2	17	--
08/12/03	2.1	--	35	151	--	--	--	--	--	--	<1.0	12	--
02/24/04	5.93	--	45	181	--	--	--	--	--	--	--	15	<0.20
05/06/04	5.13	--	--	179	--	--	--	--	--	--	--	--	--
08/04/04	0.00531	--	--	-40	--	--	--	--	--	--	<1.0	11	1.4
11/10/04	2.32	--	--	--	--	--	--	--	--	--	--	--	--
02/03/05	4.1	--	16	75	297	16.2	5.84	0.60	21.90	0.00	6	45	<0.20
05/05/05	5.23	--	6	45	--	--	--	0.10	20.90	0.00	--	--	--
08/04/05	1.53	--	20	41	283	17.8	5.90	0.20	20.90	0.00	<1.0	45	0.65
11/03/05	1.91	--	6	-025	275	16.3	6.06	0.00	20.90	0.00	--	--	--
<b>Average Concentrations</b>	<b>3.32</b>			<b>103.35</b>	<b>286.00</b>		<b>6.93</b>	<b>0.23</b>	<b>21.16</b>	<b>0.00</b>	<b>4.16</b>	<b>16.76</b>	<b>1.03</b>
<b>MW-11</b>													
08/22/95	--	--	--	--	--	--	--	--	--	--	--	--	--
05/19/99	0.22	0.20	1.9	66.7	--	--	--	--	--	--	3.9	11	--
08/05/99	1.16	2.08	3.3	46.3	--	--	--	--	--	--	ND	9.6	--
11/24/99	5.71	6.33	11	533	--	--	--	--	--	--	5	11	--
02/15/00	6.08	6.66	--	185	--	--	--	--	--	--	6.4	10	--
05/11/00	6.93	5.77	ND	173	--	--	--	--	--	--	ND	9.6	--
08/09/00	2.64	3.56	6.4	58	--	--	--	--	--	--	ND	8	--
11/27/00	3.14	3.51	6.7	89	--	--	--	--	--	--	ND	7.9	--
02/14/01	5.9	6.9	9.3	264	--	--	--	--	--	--	ND	10	--
05/11/01	5.5	6.7	9.0	258	--	--	--	--	--	--	0.504	12	--
08/09/01	3.9	5.3	11	258	--	--	--	--	--	--	<1.0	2.8	--

**Table 3**  
**Bio-Attenuation Parameters**

Former Bulk Plant No. 0220  
720 North Franklin Street  
Fort Bragg, California

	Pre-Purge Dissolved Oxygen	Post Purge Dissolved Oxygen	Dissolved Carbon Dioxide	Oxidation- Reduction Potential	Conductivity (µS/cm)	Temp (°C)	pH	Head Space			Nitrate, NO <sub>3</sub>	Sulfate, SO <sub>4</sub>	Ferrous Iron, Fe (II)
								Carbon Dioxide	Oxygen	Organic Vapor			
11/30/01	5.1	6.4	13	189	--	--	--	--	--	--	1.6	12	--
02/07/02	3.9	4.8	13	266	--	--	--	--	--	--	0.99	11	--
05/10/02	1.7	--	14	30	--	--	--	--	--	--	0.32	7.5	--
08/15/02	2.8	--	13	-31	--	--	--	--	--	--	<0.89	2.6	--
11/14/02	1.1	--	22	126	--	--	--	--	--	--	<0.20	13	--
02/13/03	2.4	--	ND<10	61	--	--	--	--	--	--	1.9	14	--
05/16/03	3.8	--	ND<10	220	--	--	--	--	--	--	<1.0	98	--
08/12/03	1.9	--	36	56	--	--	--	--	--	--	<1.0	4.6	--
02/24/04	2.81	--	50	202	--	--	--	--	--	--	--	13	<0.20
05/06/04	6.67	--	--	46	--	--	--	--	--	--	--	--	--
08/04/04	5.76	--	--	-31	--	--	--	--	--	--	<1.0	5.2	2.5
11/10/04	1.64	--	--	--	--	--	--	--	--	--	--	--	--
02/03/05	7.13	--	5	38	308	18.1	5.66	0.10	22.10	0.00	6	42	<0.20
05/05/05	5.60	--	6	-002	244	15.9	6.40	0.00	20.90	0.00	--	--	--
08/04/05	1.50	--	17	10	247	16.4	6.07	0.10	20.90	0.00	<1.0	18	0.43
11/03/05	160	--	8	-052	267	15.6	6.10	0.00	20.90	0.00	--	--	--
<b>Average Concentrations</b>	<b>9.81</b>			<b>135.78</b>	<b>265.50</b>		<b>6.11</b>	<b>0.65</b>	<b>21.20</b>	<b>0.00</b>	<b>2.96</b>	<b>15.13</b>	<b>1.47</b>
<b>MW-12</b>													
05/19/99	0.35	0.28	--	11.3	--	--	--	--	--	--	--	--	--
08/05/99	6.80	5.41	1.0	24.8	--	--	--	--	--	--	9.1	29	--
02/15/00	8.20	8.57	--	239	--	--	--	--	--	--	9.3	25	--
08/09/00	7.19	6.58	ND	152	--	--	--	--	--	--	6.2	21	--
02/14/01	8.6	7.4	5.4	285	--	--	--	--	--	--	7	18	--
08/09/01	6.8	6.1	5.0	256	--	--	--	--	--	--	10	20	--
02/07/02	9	8.9	ND<10	244	--	--	--	--	--	--	2.7	13	--
08/15/02	1.9	--	15	52	--	--	--	--	--	--	8.8	19	--
08/12/03	1.20	--	26	283	--	--	--	--	--	--	8.8	21	--
02/24/04	6.13	--	30	167	--	--	--	--	--	--	--	19	<0.20
05/06/04	5.27	--	--	210	--	--	--	--	--	--	--	--	--
08/04/04	5.28	--	--	-61	--	--	--	--	--	--	6	19	<0.20
02/03/05	8.37	--	6.00	69	270	16.2	6.27	0.60	0.00	21.80	11	19	<0.20
5/5/2005	6.93	--	5	018	--	--	--	0.20	20.90	0.00	--	--	--
08/04/05	5.64	--	12	102	226	17.0	6.21	0.40	20.90	28.50	6.6	20	<0.20
11/03/05	5.49	--	7	-063	200	16.1	6.42	0.00	20.90	0.00	--	--	--
<b>Average Concentrations</b>	<b>6.83</b>			<b>147.44</b>	<b>232.00</b>		<b>6.30</b>	<b>0.30</b>	<b>16.68</b>	<b>12.68</b>	<b>8.14</b>	<b>20.26</b>	<b>&lt;.20</b>

Table 4  
Ozone Injection - System Operation Data  
ConocoPhillips Site # 0220  
720 North Franklin St, Ft Bragg, California

System 1																										
OZONE SPARGE SYSTEM																										
Date	Notes	System Status (On/Off)		Hourmeter Reading	Period Online	Cumulative Online	SP-1		SP-2		SP-3		SP-4		SP-5		SP-6		SP-7		SP-8		SP-9		SP-10	
		Arrival	Departure				Pressure (psi)	Pressure (psi)	Pressure (psi)	Pressure (psi)	Pressure (psi)	Pressure (psi)	Pressure (psi)	Pressure (psi)	Pressure (psi)	Pressure (psi)	Pressure (psi)	Pressure (psi)	Pressure (psi)	Pressure (psi)	Pressure (psi)	Pressure (psi)	Pressure (psi)	Pressure (psi)	Pressure (psi)	Pressure (psi)
1/20/2005	a	Off	Off	--			--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/17/2005		Off	Off	1208																						
3/18/2005		Off	Off	1381	24.9%	173																				
4/12/2005	b	Off	Off	3778	399.5%	2570																				
5/17/2005		Off	Off	3778	0.0%	2570	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/6/2005		Off	Off	3778	0.0%	2570	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/11/2005		Off	Off	3778	0.0%	2570	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/9/2005	c	Off	Off	3778	0.0%	2570	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/6/2005		Off	Off	3778	0.0%	2570	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/3/2005		Off	Off	3778	0.0%	2570	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/1/2005		Off	Off	3778	0.0%	2570	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/5/2005		Off	Off	3778	0.0%	2570	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/30/2006		Off	Off	3778	0.0%	2570	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/16/2006		Off	Off	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Spurge time per Cycle (min)							8		8		8		8		8		0		8		8		8		8	

System 1																										
OZONE SPARGE SYSTEM																										
Date	Notes	System Status (On/Off)		Hourmeter Reading	Period Online	Cumulative Online	SP-11		SP-12		SP-13		SP-14		SP-15		SP-16		SP-17		SP-18		SP-19		SP-20	
		Arrival	Departure				Pressure (psi)	Pressure (psi)	Pressure (psi)	Pressure (psi)	Pressure (psi)	Pressure (psi)	Pressure (psi)	Pressure (psi)	Pressure (psi)	Pressure (psi)	Pressure (psi)	Pressure (psi)	Pressure (psi)	Pressure (psi)	Pressure (psi)	Pressure (psi)	Pressure (psi)	Pressure (psi)	Pressure (psi)	Pressure (psi)
1/20/2005	a	Off	Off	--			--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/17/2005		Off	Off	1208			--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/18/2005		Off	Off	1381	24.9%	173	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/12/2005	b	Off	Off	3778	399.5%	2570	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/17/2005		Off	Off	3778	0.0%	2570	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/6/2005		Off	Off	3778	0.0%	2570	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/11/2005		Off	Off	3778	0.0%	2570	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/9/2005	c	Off	Off	3778	0.0%	2570	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/6/2005		Off	Off	3778	0.0%	2570	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/3/2005		Off	Off	3778	0.0%	2570	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/1/2005		Off	Off	3778	0.0%	2570	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/5/2005		Off	Off	3778	0.0%	2570	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/30/2006	d	Off	Off	3778	0.0%	2570	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/16/2006		Off	Off	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Spurge time per Cycle (min)							8		8		8		8		8		0		8		8		8		8	

Table 5  
Drone Injection - Groundwater Monitoring Data  
Cooper/Phillips Site # 0220  
720 North Franklin St. Ft Bragg, California

Date	Note	Monitoring Well: MW-1						Monitoring Well: MW-4						Monitoring Well: MW-8					
		ORP (mv)	DO (mg/l)	TPHg (ug/L)	TPHd (ug/L)	Benzene (ug/L)	Toluene (ug/L)	Ethylbenzene (ug/L)	Xylenes (total) (ug/L)	MIBE (ug/L)	ORP (mv)	DO (mg/l)	TPHg (ug/L)	TPHd (ug/L)	Benzene (ug/L)	Toluene (ug/L)	Ethylbenzene (ug/L)	Xylenes (total) (ug/L)	MIBE (ug/L)
2/17/2005	a, b	--	0.67	120	1,300	<0.50	<0.50	<0.50	<1.0	<0.50	--	0.96	4,000	17,000	<2.0	<2.0	<2.0	<4.0	<2.0
3/18/2005	b	112	1.8	220	1,600	<0.50	<0.50	<0.50	<1.0	<0.50	43	1.8	8,000	20,000	<2.0	<2.0	<2.0	<4.0	<2.0
4/12/2005		95	4	77	460	<0.50	<0.50	<0.50	<1.0	<0.50	-13	9	980	5,100	<0.50	<0.50	<0.50	<1.0	<0.50
5/17/2005	b	120	6	120	<50	<0.50	<0.50	<0.50	<1.0	<0.50	12	4	8,400	190,000	<50	<50	<50	<100	<50
6/6/2005	b, c	92	5	<50	110	<0.50	<0.50	<0.50	<1.0	<0.50	-44	3	2,600	9,400	<5.0	<5.0	<5.0	<10	<5.0
7/11/2005	b, c	35	--	88	360	<0.50	<0.50	<0.50	<1.0	<0.50	-26	--	200	450	<0.50	<0.50	<0.50	<1.0	<0.50
8/6/2005		56	7	52	1,200	<0.50	<0.50	<0.50	<1.0	<0.50	-55	5	15,000	94,000	<0.50	<0.50	<0.50	<1.0	<0.50
9/6/2005		64	3	<50	94	<0.50	<0.50	<0.50	<1.0	<0.50	-85	2	1,300	140,000	<2.0	<2.0	<2.0	<4.0	<2.0
10/3/2005		141	2	<50	350	<0.50	<0.50	<0.50	<1.0	<0.50	-62	1.50	1,400	140,000	<2.0	<2.0	<2.0	<4.0	<2.0
11/12/2005		18	2	99	860	<0.50	<0.50	<0.50	<1.0	<0.50	50	1.00	1,100	8,600	<0.50	<0.50	<0.50	<1.0	<0.50
12/5/2005		--	--	<50	<50	<0.50	<0.50	<0.50	<1.0	<0.50	--	--	110	140	<0.50	<0.50	<0.50	<1.0	<0.50
1/5/2006	d	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Definitions:

ORP Oxidation Reduction Potential  
DO Dissolved Oxygen  
TPHg Total petroleum hydrocarbons as gasoline  
MIBE Methyl tert-butyl ether  
ug/L Micrograms per liter  
mv Millivolts  
mg/L Milligrams per liter  
ppm Not measured  
ppm Parts Per Million

Notes:

- a SECOR began reporting, SHN continues O&M
- b Reporting limits were raised due to high level of analyte present in sample
- c pH < 2
- d SECOR began O&M

**ATTACHMENT 1**

**RWQCB-NCR MRP NO. R1-2003-0107**

2005 Annual Summary and Monitoring Report

Bulk Plant No. 0220

720 North Franklin Street

Fort Bragg, California

SECOR Project No.: 77CP.60009.01.0220

California Regional Water Quality Control Board  
North Coast Region

Revised Monitoring and Reporting Program No. RI-2003-0107

for

Unocal Bulk Plant #0220  
720 North Franklin Street  
Fort Bragg, California

Mendocino County

**MONITORING**

1. The depth to groundwater in all monitoring wells shall be determined to at least 0.01 foot increments quarterly. The results shall be reported in tabular form indicating the surveyed elevation of each well reference point, depth to groundwater from the reference point, and the actual groundwater elevation. The data generated from the elevation readings must be referenced to mean sea level.
2. Groundwater in each monitoring well shall be monitored quarterly for dissolved oxygen, dissolved carbon dioxide, oxidation-reduction potential, pH, temperature, and conductivity.
3. Headspace in each monitoring well shall be monitored quarterly using field instruments to measure percent oxygen, percent carbon dioxide, and organic vapor.
4. Groundwater in each monitoring well shall be sampled according to Table 1 (Attached). The analyses shall be performed by a state certified laboratory for total petroleum hydrocarbons as gasoline (TPH-g), total petroleum hydrocarbons as diesel (TPH-d), benzene, toluene, ethylbenzene, xylene (collectively identified as BTEX), methyl tertiary butyl ether (MTBE), dissolved methane, dissolved iron, dissolved manganese, nitrate, and sulfate (collectively identified as ADDITIONAL).

**REPORTING**

1. The following maps shall be submitted with each quarterly monitoring report:
  - a. A map of the facility showing the quarterly groundwater flow pattern, including the direction of the groundwater gradient and the location of all monitoring wells, and
  - b. A map of the facility showing the quarterly chemical concentrations.
2. The results of each quarter's elevation shall be reported in a tabular form indicating the surveyed elevations of each reference point, depth to groundwater from the reference point, and the actual groundwater elevation.

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3. Sampling analytical and monitoring data from each quarter shall be summarized in tabular form, including all previously generated sampling data.
4. Monitoring reports shall be submitted to the Regional Water Board at a quarterly frequency. Monitoring reports shall be prepared by or under the supervision of a California Registered Engineer or Geologist. Monitoring reports shall be submitted to this office in accordance with the following schedule:

<u>Reporting Period</u>	<u>Due Date</u>
January, February, March (1 <sup>st</sup> Quarter)	April 15
April, May, June (2 <sup>nd</sup> Quarter)	July 15
July, August, September (3 <sup>rd</sup> Quarter)	October 15
October, November, December (4 <sup>th</sup> Quarter)	January 15

5. All monitoring reports, data, and depth to groundwater shall also be submitted electronically to the State Water Resources Control Board's Geographic Environmental Information Management System database (GeoTracker) as required by Title 23, Division 3, Chapter 16, Article 12 of the California Code of Regulations (i.e., AB2886 electronic reporting requirements)<sup>1</sup>
6. An annual report shall be submitted to the Regional Water Board by January 15 of each year. The annual report serves as a document to evaluate data generated throughout each calendar year. This report needs to include a full evaluation of all data generated throughout the year, including concentration trend evaluation for all analyses performed, evaluation of all indicator parameters in terms of remedial effectiveness, conditions of the remedial system, and an overall evaluation of the effectiveness of the active remedial system.
7. The annual report shall also include all maintenance and operations records for the entire year. Records should include date of inspections, parameters measured, summary of visual observations made, and changes made to the operating system.

Ordered by



Catherine Kuhlman  
Executive Officer

May 3, 2005

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<sup>1</sup> Information on AB2886 electronic reporting can be obtained on the Internet by following the Electronic Submittal of Information link on the GeoTracker home page at <http://geotracker.waterboards.ca.gov/>.

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Table 1

Well ID	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
MW-1	TPH-g, TPH-d, BTEX, MTBE		TPH-g, TPH-d, BTEX, MTBE	
MW-2	TPH-g, TPH-d, BTEX, MTBE		TPH-g, TPH-d, BTEX, MTBE	
MW-3	TPH-g, TPH-d, BTEX, MTBE		TPH-g, TPH-d, BTEX, MTBE	
MW-4	TPH-g, TPH-d, BTEX, MTBE, ADDITIONAL	TPH-g, TPH-d, BTEX, MTBE	TPH-g, TPH-d, BTEX, MTBE, ADDITIONAL	TPH-g, TPH-d, BTEX, MTBE
MW-5	TPH-g, TPH-d, BTEX, MTBE		TPH-g, TPH-d, BTEX, MTBE	
MW-6	TPH-g, TPH-d, BTEX, MTBE			
MW-7	TPH-g, TPH-d, BTEX, MTBE			
MW-8	TPH-g, TPH-d, BTEX, MTBE	TPH-g, TPH-d	TPH-g, TPH-d, BTEX, MTBE	TPH-g, TPH-d
MW-9	TPH-g, TPH-d, BTEX, MTBE			
MW-10	TPH-g, TPH-d, BTEX, MTBE, ADDITIONAL		TPH-g, TPH-d, BTEX, MTBE, ADDITIONAL	
MW-11	TPH-g, TPH-d, BTEX, MTBE, ADDITIONAL	TPH-g, TPH-d	TPH-g, TPH-d, BTEX, MTBE, ADDITIONAL	TPH-g, TPH-d
MW-12	TPH-g, TPH-d, BTEX, MTBE, ADDITIONAL		TPH-g, TPH-d, BTEX, MTBE, ADDITIONAL	

**ATTACHMENT 2**  
**TRC'S QUARTERLY MONITORING REPORT OCTOBER**  
**THROUGH NOVEMBER, 2005**

2005 Annual Summary and Monitoring Report

Bulk Plant No. 0220

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Fort Bragg, California

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